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(54) **NON-LINEAR AXISYMMETRIC POTENTIAL FLOW BOUNDARY MODEL FOR PARTIALLY CAVITATING HIGH SPEED BODIES**

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(57) **ABSTRACT**

A method for calculating parameters about an axisymmetric body in a cavity is provided. The user provides data describing the body, a cavity estimate, and convergence tolerances. Boundary element panels are distributed along the body and the estimated cavity. Matrices are initialized for each panel using disturbance potentials and boundary values. Disturbance potential matrices are formulated for each panel using disturbance potential equations and boundary conditions. The initialized matrices and the formulated matrices are solved for each boundary panel to obtain panel sources, dipoles and cavitation numbers. Forces and velocities are computed giving velocity and drag components. The cavity shape is updated by moving each panel in accordance with the calculated values. The method then tests for convergence against a tolerance, and iterates until convergence is achieved. Upon completion, parameters of interest and the cavity shape are provided. This invention also allows determination of cavity shape for a cavitation number.

12 Claims, 3 Drawing Sheets

